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EXAMINER	
LAVIN, CHRISTOPHER L	
ART UNIT	**PAPER NUMBER**
2621	

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/970,144	HERLEY, CORMAC E.	
	Examiner	Art Unit	
	Christopher L Lavin	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 October 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 10, 21, and 30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The use of two thresholds to divide an image into two colors does not make sense.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1 – 9, 11 – 20, 22, 23, 25 – 29, and 31 - 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoshan (6,670,986) in view of Steinkirchner (5,392,365).

6. In regards to claim 1, Shoshan discloses prior art in the paragraph starting at column 1, line 45 a image capturing method designed to increase the resolution of a CCD sensor by taking multiple pictures of a document and then combining the images. Lateral jittering is imparted on the CCD sensor through the use of a piezoelectric driver. "Thus, by taking three shots of each pixel, each pixel is photographed in its three basic colors." It should be noted that Shoshan discloses an improved version of this method, which allows the CCD camera to be rotated to take images of vertical objects. Shoshan does not specify that piezoelectric oscillators are used to provide the jittering in the improved version disclosed by Shoshan. Shoshan does disclosed in the paragraph starting at column 4, line 57 "movement means which comprises a linear actuator". Official notice is taken that it is well known in the art that linear actuators can be designed with piezoelectric oscillators. Shoshan does not disclose the possible items that could be imaged with the method described above nor does the patent discus post imaging processing.

7. Steinkirchner teaches in the paragraph starting at column 2, line 57 that a digital image of a text document is taken. In the paragraph starting at column 3, line 8 Steinkirchner discloses that, "the eight-bit image signal from scanner 10 is compared at a thresholder". Thresholding a two-tone image into two colors is a form of sharpening; sharpening is de-blurring.

8. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to include the post processing procedures disclosed by Steinkirchner to a text document captured by the method disclosed by Shoshan. In order for a computer to interpret a text document a high-resolution image is required. The method disclosed by Shoshan provides a faster means of imaging a text document in high-resolution over a scanner. By using the post processing procedures of Steinkirchner the text is prepared for interpretation by a computer. Thus reducing the workload further for the computer.

9. In regards to claim 2, Shoshan discloses an "X-Y movement apparatus" in the paragraph starting at column 4, line 57. Thus lateral jittering is imparted in a pair (x and y axes) of transverse directions.

10. In regards to claim 3, the x and y axes in Cartesian coordinate systems are defined by being perpendicular to each other.

11. In regards to claim 4, the steps for imaging disclosed by Shoshan does not simultaneously move the CCD sensor in both directions, however the system is capable of doing this.

12. In regards to claim 5, Shoshan discloses the imaging steps in column 6, lines 12 – 48. The steps disclosed by Shoshan are a cyclic.

13. In regards to claim 6, a CCD sensor is an array of optical detectors corresponding to pixels and having pixel dimensions. In the paragraph starting at column 6, line 29 Shoshan discloses that "the CCD is moved along, say, the X-axis, a distance that is equal to the size of one CCD cell [a pixel]".

14. In regards to claim 7, by moving the CCD only one pixel up, down, left or right substantially the entire text document is captured, at most one pixel of the width or length of an image will be cut off.

15. In regards to claim 8, the CCD camera disclosed by Shoshan uses a "bayer" pattern, which means that the imaging systems disclosed by Shoshan will take multiple green images of some pixels. This green information will need to be combined using sums and averages. It would have been obvious to one having ordinary skill in the art at the time of the invention that a weighted sum could be used instead of a average for example each green data is given a weight of .5. This may prove to be a faster computation than averaging.

16. In regards to claim 9, as mentioned previously in the rejection of claim 1, in the paragraph starting at column 3, line 8 Steinkirchner discloses that, "the eight-bit image signal from scanner 10 is compared at a thresholder" the resulting thresholded image is a representation of the enhanced resolution representation in only two image levels.

17. In regards to claim 11, Steinkirchner discloses in the paragraph starting at column 3, line 8 that after de-blurring the image is "then low pass filtered at 30, removing noise from the image and blurring (therefore widening) the edges of the characters". This is the equivalent to a blurring filter.

18. In regards to claim 12, a CCD sensor is an array of optical detectors corresponding to pixels and having pixel dimensions. The blur filter shown in the rejection of claim 11 if it is to be used on a digital image would have to have a filter dimension corresponding to that of a pixel dimension.

19. In regards to claim 13, Shoshan discloses prior art in the paragraph starting at column 1, line 45 a image capturing system designed to increase the resolution of a CCD sensor by taking multiple laterally displaced pictures of a document and then combining the images. A Lateral jittering mechanism for imparting jittering on the CCD sensor through the use of a piezoelectric driver is disclosed. "Thus, by taking three shots of each pixel, each pixel is photographed in its three basic colors." It should be noted that Shoshan discloses an improved version of this system, which allows the CCD camera to be rotated to take images of vertical objects. Shoshan does not specify that piezoelectric oscillators are used to provide the jittering in the improved version disclosed by Shoshan. Shoshan does disclosed in the paragraph starting at column 4, line 57 "movement means which comprises a linear actuator". Official notice is taken that it is well known in the art that linear actuators can be designed with piezoelectric drivers. Shoshan does not disclose the possible items that could be imaged with the system described above nor does the patent discus post imaging processing.

20. Steinkirchner teaches in the paragraph starting at column 2, line 57 that a digital image of a text document is taken. In the paragraph starting at column 3, line 8 Steinkirchner discloses that, "the eight-bit image signal from scanner 10 is compared at a thresholder". Thresholding a two-tone image into two colors is a form of sharpening; sharpening is de-blurring.

21. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to include the post processing procedures disclosed by Steinkirchner to a text document captured by the method disclosed by Shoshan. In

order for a computer to interpret a text document a high-resolution image is required. The method disclosed by Shoshan provides a faster means of imaging a text document in high-resolution over a scanner. By using the post processing procedures of Steinkirchner the text is prepared for interpretation by a computer. Thus reducing the workload further for the computer.

22. In regards to claim 14, Shoshan discloses an "X-Y movement apparatus" in the paragraph starting at column 4, line 57. Thus lateral jittering is imparted in a pair (x and y axes) of transverse directions. Shoshan discloses the imaging steps in column 6, lines 12 – 48. The steps disclosed by Shoshan are a cyclic.

23. In regards to claim 15, as discussed in the rejection of claim 13 the x-y movement apparatus can be implemented with piezoelectric oscillators.

24. In regards to claim 16, Shoshan discloses an "X-Y movement apparatus" in the paragraph starting at column 4, line 57. Thus lateral jittering is imparted in a pair (x and y axes) of transverse directions.

25. In regards to claim 17, a CCD sensor is an array of optical detectors corresponding to pixels and having pixel dimensions. In the paragraph starting at column 6, line 29 Shoshan discloses that "the CCD is moved along, say, the X-axis, a distance that is equal to the size of one CCD cell [a pixel]".

26. In regards to claim 18, by moving the CCD only one pixel up, down, left or right substantially the entire text document is captured, at most one pixel of the width or length of an image will be cut off.

27. In regards to claim 19, Steinkirchner discloses in the paragraph starting at column 3, line 8 that a CPU is used to implement the post-imaging processing. Inherent with a CPU is a computer. So the system disclosed by Shoshan in view of Steinkirchner includes a computer. As mentioned previously in the rejection of claim 13, thresholding is the equivalent to de-blurring an image.

28. In regards to claim 20, as mentioned previously in the rejection of claim 13, in the paragraph starting at column 3, line 8 Steinkirchner discloses that, "the eight-bit image signal from scanner 10 is compared at a thresholder" the resulting thresholded image is a representation of the enhanced resolution representation in only two image levels.

29. In regards to claim 22, Steinkirchner discloses in the paragraph starting at column 3, line 8 that after de-blurring the image is "then low pass filtered at 30, removing noise from the image and blurring (therefore widening) the edges of the characters". This is the equivalent to a blurring filter.

30. In regards to claim 23, a CCD sensor is an array of optical detectors corresponding to pixels and having pixel dimensions. The blur filter shown in the rejection of claim 22 if it is to be used on a digital image would have to have a filter dimension corresponding to that of a pixel dimension.

31. In regards to claim 25, the method of claim 1 and the system of claim 13 can be implemented with software stored on a computer-readable medium.

32. In regards to claim 26, the method of claim 2 can be implemented with software stored on a computer-readable medium.

33. In regards to claim 27, the method of claim 6 can be implemented with software stored on a computer-readable medium.

34. In regards to claim 28, the method of claim 8 can be implemented with software stored on a computer-readable medium.

35. In regards to claim 29, the method of claim 9 can be implemented with software stored on a computer-readable medium.

36. In regards to claim 31, the method of claim 11 can be implemented with software stored on a computer-readable medium.

37. In regards to claim 32, the method of claim 12 can be implemented with software stored on a computer-readable medium.

38. In regards to claim 33, Shoshan discloses prior art in the paragraph starting at column 1, line 45 a image capturing method designed to increase the resolution of a CCD sensor by taking multiple pictures of a document and then combining the images. Lateral jittering is imparted on the CCD sensor through the use of a piezoelectric driver. "Thus, by taking three shots of each pixel, each pixel is photographed in its three basic colors." This is the step of obtaining multiple laterally displaced digital images of all of the spatially piecewise constant image. It should be noted that Shoshan discloses an improved version of this method, which allows the CCD camera to be rotated to take images of vertical objects. Shoshan does not specify that piezoelectric oscillators are used to provide the jittering in the improved version disclosed by Shoshan. Shoshan does disclosed in the paragraph starting at column 4, line 57 "movement means which comprises a linear actuator". Official notice is taken that it is well known in the art that

linear actuators can be designed with piezoelectric oscillators. Finally the step of forming from the multiple laterally displaced images an enhanced resolution is preformed as seen in the paragraph starting at column 6, line 46. Shoshan does not disclose the possible items that could be imaged with the method described above nor does the patent discus post imaging processing.

39. Steinkirchner teaches in the paragraph starting at column 2, line 57 that a digital image of a text document is taken. In the paragraph starting at column 3, line 8 Steinkirchner discloses that, "the eight-bit image signal from scanner 10 is compared at a thresholder". Thresholding a two-tone image into two colors is a form of sharpening; sharpening is de-blurring.

40. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to include the post processing procedures disclosed by Steinkirchner to a text document captured by the method disclosed by Shoshan. In order for a computer to interpret a text document a high-resolution image is required. The method disclosed by Shoshan provides a faster means of imaging a text document in high-resolution over a scanner. By using the post processing procedures of Steinkirchner the text is prepared for interpretation by a computer. Thus reducing the workload further for the computer.

41. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shoshan in view of Steinkirchner as applied to claim 13 above, and further in view of Reinsch (5,083,313).

42. In regards to claim 24, the system disclosed by Shoshan in view of Steinkirchner would require some means to calibrate the jittering mechanism. However Shoshan does not disclose how this calibration would be preformed.

43. Reinsch teaches in the paragraph starting at column 15, line 44 that a target can be used to calibrate an imaging system.

44. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to include a calibration target to calibrate the jittering mechanism. Overtime piezoelectric oscillators will change characteristics slightly, so calibration will be required to keep the movement to one pixel element. A calibration target would make sense for a digital imaging system like the one disclosed by Shoshan.

45. Claims 10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoshan in view of Steinkirchner as applied to claims 9 and 20 respectively, and further in view of Kannapell (4,593,325).

46. In regards to claimd 10 and 21, thresholding an image into two colors can be accomplished with one threshold value, which is what Steinkirchner discloses. Steinkirchner does not disclose using two thresholds.

47. Kannapell teaches in the paragraph starting at column 6, line 63 that two thresholds are used to threshold a text document.

48. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to use two thresholds to de-blur the text document obtained by Shoshan. This could allow for a better overall thresholding of the text document.

49. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shoshan in view of Steinkirchner and further in view of Kannapell as applied to claims 10.

50. In regards to claim 30, the method claim 10 can be implemented with software stored on a computer-readable medium.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher L Lavin whose telephone number is 703-306-4220. The examiner can normally be reached on M - F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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